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Maximizing profits through better sales-mixture control

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Maximizing Profits Through Better Sales-Mixture Control

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As controllers, you know that some sales are more profitable than others. You know that, at a given volume, total profits will be greater when more of the total sales stems from the more profitable products. Too often, however, control of this important element in the success of a business is based upon rather unsophisticated techniques.

The present trend toward more scientific management very likely will produce useful techniques for controlling sales mixture. Meanwhile, controllers can develop surprisingly effective control from existing techniques.

Obviously, a "cookbook" plan for controlling sales mixture – a plan applicable to all companies – has never been developed, nor is one likely to be developed. The type and degree of control needed by a particular company will depend upon the type of industry to which it belongs, the number of product lines carried by the company, the number of products within each line, its distribution channels, and other factors. The plan to be discussed here was "custom made" for a particular company. Many features of the plan, however, can be modified to meet the needs of a variety of other businesses.

BASIC CONCEPTS

MARGINAL PROFIT

The plan uses direct costing techniques. However, since many controllers – and their independent public accountants – are not completely "sold" on direct costing, I will refer to direct costs as variable costs. Also, as you will see, a complete direct cost system is not needed for the success of the plan. The plan capitalizes on certain advantages of direct costing for planning and control purposes, but permits orthodox practices regarding inventory valuation and report presentation.

The basic approach of the plan is that marginal profit, rather than gross profit, is the key to sales-mix control. Marginal profit represents sales less variable costs. Variable costs, such as direct labor and production materials, are incurred only because the particular product is carried. Fixed costs, known also as standby costs or constant expenses, are excluded in the determination of marginal profits.

Did you ever try to figure how much it costs per mile to run your automobile? If you have, you probably used certain principles of direct costing. For example, let's assume that depreciation, insurance, and taxes on your car amount to $1,000 a year. Let's assume also that gasoline, oil, and other variable costs amount to three cents a mile. Now, if you drive 10,000 miles during the year, your fixed expenses will average ten cents a mile and your total cost will be thirteen cents a mile. But what happens if you drive 20,000 miles a year? Your fixed expenses will average five cents a mile and your total cost will be only six cents a mile. So you really can't tell what your cost per mile is until you know how many miles you drive a year.

So it is with sales-mix control. You really can't tell what it costs per unit to make a product until you know how many units are concerned. The customary standard cost of a product is traditionally stated as a flat amount per unit, regardless of volume. We must segregate the fixed expenses in these product costs if we are to measure the effect of volume changes on profit. We must think in terms of marginal profits, rather than gross profits.

What is the goal of sales-mix control? It is to produce and sell a combination of products that results in a profit contribution which covers, by the widest margin, those expenses that continue regardless of volume and regardless of the sales mixture.

PLANNING, FORECASTING, AND CONTROL

A word about planning and forecasting. What is the difference between the two? Forecasting is a company's best thinking about what will happen in the future, based on past trends and prevailing conditions. Planning, on the other hand, is a company's best thinking about what can be *caused* to happen, again based on past trends and prevailing conditions, but based also on reliable information about matters that can be controlled by the company.

The over-all profit plan to be discussed here is a *top* management tool. Its basic approach is that control is effected by measuring actual performance against pre-determined goals. Under this approach, actual results are not compared with last year, nor are they compared with last month. Instead, the actual results are compared with planned results. This philosophy applies to *all* the elements that affect net profit. Sales mixture is just one of these elements.

The complete plan consists of three cycles: a planning cycle, a forecasting cycle, and a control cycle.

The objective of the planning cycle is to develop a realistic net profit plan that is acceptable to management. The cycle is done only once a year.

It starts in the sales department. A sales plan is prepared for the coming year, showing total sales and the sales mixture according to specified classifications. The controller's department then computes the net profit that is expected to result from the sales plan. To do this, he applies standard variable costs to the planned sales and takes into account the budget of fixed expenses. Top management then appraises the proposed profit plan. If the plan is not acceptable, the cycle is repeated. The sales department takes another look at quantities, mix, prices, and marginal profits. The controller re-examines the budget of fixed expenses. Eventually a satisfactory and attainable profit plan is developed.

The forecasting cycle is done once a month. The objective of this cycle is to obtain advance notice of unfavorable trends or conditions. This cycle also starts in the sales department. Two sales forecasts are made each month – one for the next month and one for the remainder of the year. The controller's department then forecasts the net profits that are expected to result from the sales, taking into account variable costs, revised estimates of fixed expenses, and a projection of variances realized to date. A report is prepared comparing the forecast with the master plan. Top management then reviews the net profit forecasts for the next month and remainder of year. Unfavorable trends or conditions are thus spotted, and remedial action instituted, thirty days before actual results are known.

The control cycle starts in the controller's department. Actual results for the current month and for the year to date are compared with the master profit plan. Unfavorable sales-mix trends are spotted and reported to the sales department. A report on the master profit plan is prepared for top management. This report shows the reason for deviations from the plan, both as to actual results and as to current forecasts. Action is then taken to bring unfavorable trends back into line.

Control means action. Reports in themselves do not guarantee control. But effective reports are necessary for good management control.

Let's now take a look and see how all of this is done.

We will start with the planning cycle.

PLANNING

THE SALES PLAN

Exhibit A is a form for summarizing the master sales plan for the year. Fifty product classes are provided for in this illustration, but the plan will accommodate any number. If only a few products are handled, it would not be necessary to group them into classes. In such cases, each individual product would appear in the forecast.

It is assumed, throughout this illustration, that each class comprises many products, perhaps several hundred. It is also assumed that three customer classes or distribution channels are used, each with its own pricing structure. Other customer classifications may be needed by some concerns, such as classifications for intercompany sales, export sales, etc.

The sales department prepares a forecast of quantities to be sold during the coming year. The average price for each classification is predetermined, based on past experience. Quantities are extended at these prices, unless the sales department forecasts a change in one or more of the averages. Such a change would be forecast, for example, if price changes were scheduled or if the previous mix of products in a given classification is not expected to continue.

The standard variable cost for each classification is determined by the controller's department. It is assumed that the company has a standard cost accounting system and that product costs have been segregated as to variable costs and fixed costs. The average variable cost for each classification is based upon past experience relating to the mix of products in these classifications.

Marginal profits are computed for each classification. The P/V ratio is the "profit-volume" ratio and is computed by dividing marginal profit by net sales.

The next step is to sort this information into so-called "profit groups."

PROFIT GROUPS

The concept of the "profit group" is basic to this plan for controlling sales mix.

When only a few products are dealt in, control can be exercised on a simple product-for-product basis. Many companies, however, manufacture and sell hundreds or even thousands of products during a year's time. For these companies, control requires a bracketing of products into "profit groups."

Profit groups are pre-established by placing all products in sequence according to their marginal profitability. Thus, all products falling within a specified range of profitability, as indicated by P/V ratios for the products, will fall into a given profit group.

In Exhibit B, the classifications in the sales forecast are sorted into ten profit groups.

The number of profit groups to be established should be held to a minimum. Their basic function is to facilitate comprehension of the over-all

effect of a change in the mixture of products. Grouped in this manner, a great number of products can be subjected to effective control.

If more than one line of products is carried, a given profit group may contain products from several lines, since products within each line usually vary as to profitability. However, if certain product lines are completely foreign to the others, separate profit groupings will usually be desirable for each set of "compatible" lines. The test here relates to the marketing characteristics, rather than to production or physical features. Separate sets of profit groups may be needed for "durable" and "non-durable" lines, for items sold to upper-income customers and to middle-income customers, for original equipment and for replacement parts, and for other classifications suggested by the company's normal trade channels.

As shown in the illustration, totals are determined for the marginal profits to be contributed by each profit group.

GROSS PROFITS

The next step is to allocate fixed factory expenses to the marginal profit of each group. This is an optional step. It is done because more people are familiar with gross profits than with marginal profits. Its effect is to reconcile the direct costing techniques with the more customary cost accounting techniques. The allocation is based on the fixed portion of the total cost of each product, taking into account previous experience with respect to the mix of product sales. The expenses allocated are those shown in the company's expense budget for the year. It is assumed here that flexible budgeting is employed in such a manner that totals for fixed and variable costs are available.

MASTER PROFIT PLAN

The next step is to prepare a tentative profit plan (Exhibit C). The totals for the various profit groups are now shown in columnar form. The relative profitability of planned sales is shown for each profit group, but the profits are brought down only through the gross profit level. No attempt is made to allocate budgeted selling and administrative expenses to the respective profit groups.

An analysis such as this highlights the importance of volume in the profit plan. Emphasis is placed on the dollars of profit contributed by each group. Thinking is led away from profit ratios, for even the low P/V groups may be profitable if the related sales volume is sufficient.

Three useful sets of ratios are developed from this statement. The first of these is the sales-mix ratio, which is the percentage of total sales attributable to each profit group. The second is the P/V ratio for each profit group.

The third is the profit-mix ratio. We shall see later how these ratios are used.

The completed profit plan is now submitted to top management for approval. As stated previously, the entire planning cycle is repeated if the initial profit plan is not accepted.

FORECASTING

We will assume that a master profit plan for the year is finally adopted. Let's now discuss the monthly forecasting cycle.

The basic steps in this cycle are similar to the steps in the planning cycle.

Step 1. The sales department prepares two sales forecasts, one for next month, and one for the remainder of the year. The forecasts will follow the same sales classifications that were used in preparing the annual sales plan. Undoubtedly the controller will want to assist the sales department by furnishing a schedule of actual sales to date in the various classifications.

Step 2. The controller's department computes the marginal profits attributable to the two forecasts, then sorts the information by profit groups.

Step 3. The controller's department then prepares a profit forecast for the next month and remainder of year.

The net profit forecast is made by deducting fixed expenses, for factory, selling, and administrative expenses, from the computed marginal profits. The fixed expenses are based on the flexible budget; allowances may be made for variances appearing in the actual cost accounts. Allowances may also be made for budget revisions submitted by the various departments.

Fixed factory expenses were allocated to profit groups in preparing the master profit plan. Such allocations need not be made in preparing the monthly profit forecasts. Gross profit as such has no further rôle in the remaining phases of this plan.

Step 4. The controller's department prepares certain charts and reports that compare the forecasts with the master plan. These will be discussed later.

Step 5. Top management, possessed with advance notice of deviations from the annual plan, institutes appropriate remedial action.

CONTROL

For control purposes, actual results are compared with the master profit plan. Comparisons against prior periods should be discouraged, since

these lead to rationalizing when used in conjunction with comparisons against the plan. For example, a department head may say, "I'm behind the plan, but since I'm ahead of last year I guess I'm all right." If the plan is sound, there is no place for thinking such as this.

Financial statements are prepared in the conventional manner at the end of the month. Next, an income statement (Exhibit D) is prepared along lines suggested by the advocates of direct costing.

INCOME STATEMENT

If all goes well, this "new look" income statement will result in the same net profit that is shown in the conventional income statement. The point here is that certain direct costing techniques can be used for management purposes without disturbing the company's traditional accounting policies. The secret to this is found in the item "adjustment to full cost basis of valuing inventories." While this adjustment requires two sets of inventory computations – one on the basis of full cost, another on the basis of variable costs – the reconcilement proves that the other amounts in the statement are reliable.

REPORT ON PROFIT PLAN

We have seen how the income statement and the forecasts of net profit are prepared. The next step is to summarize the significant features of the two statements and prepare an over-all scoreboard.

The report on the profit plan (Exhibit E) is a top report for top management. Actual deviations from the plan are summarized by source and reported in terms of departmental responsibility. The expected profit for the entire year and deviations from the planned profit for the year are available here at a single glance.

The deviations from the plan that are shown in this statement as being the responsibility of manufacturing and administration are determined from two sources: cost variances recorded in the company's cost accounts, and budget variations determined by comparing planned expenses with actual expenses. The selling expense variation is also determined by comparing planned expenses with actual.

The first four deviations shown as being the responsibility of the sales department are computed. Mathematical formulas for these computations can be found in textbooks on cost accounting. The volume loss indicates total sales are less than planned. The mix loss represents the total effect of a shifting of sales *from one profit group to another.*

The next two variances should be considered jointly. The price vari-

ance here means that the actual average selling price is above the planned average price. The cost variance means that the average standard cost is less than planned. The difference between these two variances is the effect on marginal profits of *mixture changes within each profit group*. The cost variance has nothing to do with performance variances shown in the company's cost accounts. It is based on standard variable costs which remain unchanged from period to period. Since it is caused by a change in sales mixture, it is shown in the statement as the responsibility of the sales department.

SALES MIXTURE ANALYSIS

The sales variances are now computed for each profit group. The results are summarized as shown (Exhibit C). The controller has now measured the sales pattern of the company – in relation to the annual plan.

The controller now turns his attention to sales-mix control.

SALES MIXTURE CHART

As mentioned earlier, planned marginal profits for each profit group are determined annually in connection with the preparation of the master profit plan. Actual marginal profits are similarly computed each month. Two sets of ratios are developed in connection with these computations. First, the sales-mix ratio, which is the percentage of total sales attributable to each profit group. Second, the P/V ratio for each profit group, obtained by dividing marginal profit by sales for each group.

These ratios are plotted on a graph (Exhibit F). The horizontal axis of the graph measures the profitability of each profit group in terms of the P/V ratios. The vertical axis measures sales mixture, percentage-wise. The sales-mix ratio and the P/V ratio for each profit group are plotted. The curve itself is drawn by freehand, following the best line of fit between the plotted points for each profit group.

Two curves are drawn – one for the planned sales mixture, another for the actual sales mixture. When the curve for actual results is more skewed to the left than the planned curve, proportionately more sales are being made in the less profitable groups.

From this chart a company handling hundreds of products can tell at a glance whether its sales mixture is strengthening or deteriorating.

We should note here that a similar chart can be prepared each month comparing forecasted sales mixture with the planned mixture.

MARGINAL PROFITS CHART

Next, the controller will want to dramatize the effect on profits of the

changing sales mixture. The chart of marginal profits (Exhibit G) shows the dollars of marginal profit contributed by each profit group. Emphasis is here directed to dollars, rather than ratios, because this direct costing approach portrays the effect of volume on profit contributions.

Deviations from the plan are shown on the bottom portion of the chart. In addition to indicating the dollar amount of each variance, the relative importance of each can be seen by comparing with the related planned sales.

Similar charts can be prepared comparing forecasted marginal profits with the planned marginal profits.

TREND OF PROFIT GROUPS

Having noted the general trend of sales mixture and its effect on marginal profits, the controller now begins his pursuit of the troublesome items.

A chart (Exhibit H) is prepared for each profit group, showing the month-to-month trend of marginal profits. This is a "cause and effect" chart. In the illustration shown, the total profit contribution of Profit Group 7 is falling from the planned total. The lower portion of the chart reveals that the principal cause for this unfavorable trend is a drop in sales of Product Class 9 to distributors. The controller is now in a position to take his case to the sales manager. Together, they can pinpoint the trouble to the product concerned and, if necessary, to the appropriate territory, salesmen, or customer.

CONCLUSION

By way of review, let us now summarize some of the principles we have discussed.

First, direct costing techniques provide the basic approach to sales-mix control. The concept of marginal profits provides management with a means of determining which products at given volume levels produce the greatest contribution toward the fixed expenses of the business.

Second, the advantages of direct costing techniques can be obtained without disturbing customary accounting policies and practices.

Third, sales-mix control can and should be coordinated with a company's over-all profit plan. In the case presented here, an annual profit plan serves as the yardstick for measuring deviations, whether the deviations are disclosed in monthly forecasts or in actual results to date.

Fourth, effective sales-mix control is possible even though hundreds of products are handled. The use of profit groups, whereby products are grouped according to their marginal profitability, is the key to this.

EXHIBIT A

THE XYZ COMPANY

SALES FORECAST

	NET SALES			STANDARD VARIABLE COST	MARGINAL PROFIT	P/V RATIO
	QUANTITY	AVERAGE PRICE	AMOUNT			
PRODUCT CLASS 01		$	$	$	%	%
Regular customers						
Distributors						
Special contracts						
PRODUCT CLASS 02						
Regular customers						
Distributors						
Special contracts						
PRODUCT CLASS 50						
Regular customers						
Distributors						
Special contracts						
TOTAL		$	$	$	%	%

EXHIBIT B

THE XYZ COMPANY

PLANNED GROSS PROFITS

PROFIT GROUP	PRODUCT CLASS	CUSTOMER CLASS	BUDGETED NET SALES	STANDARD VARIABLE COST	MARGINAL PROFIT	P/V RATIO	ALLOCATED FIXED EXPENSE	GROSS PROFIT	GROSS PROFIT RATIO
1	01	DISTRIBUTORS							
1	04	SPECIAL CONTRACTS ...							
		Total							
2	08	DISTRIBUTORS							
2	06	SPECIAL CONTRACTS ...							
2	01	SPECIAL CONTRACTS ...							
2	19	DISTRIBUTORS							
		Total							
10	24	REGULAR CUSTOMERS..							
10	43	SPECIAL CONTRACTS ...							
10	27	REGULAR CUSTOMERS..							
		Total							
		TOTAL							

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EXHIBIT C

PROFIT PLAN

	TOTAL	PROFIT GROUP 1 0-39%	2 40-44%	3 45-49%	4 50-54%	5 55-59%	6 60-64%	7 65-69%	8 70-74%	9 75-79%	10 89-89%
NET SALES	$	$	$	$	$	$	$	$	$	$	$
Sales-mix ratio	100%	2%	5%	13%	17%	23%	9%	19%	5%	6%	1%
VARIABLE COST OF SALES:											
Production materials	$	$	$	$	$	$	$	$	$	$	$
Direct labor											
Factory expenses											
TOTAL	$	$	$	$	$	$	$	$	$	$	$
MARGINAL PROFIT	$	$	$	$	$	$	$	$	$	$	$
P/V ratio	60%	24%	42%	47%	52%	57%	62%	67%	72%	77%	84%
Profit-mix ratio	100	3	8	7	9	17	24	12	10	8	2
FIXED FACTORY EXPENSES:											
Production departments	$	$	$	$	$	$	$	$	$	$	$
Service departments											
TOTAL	$	$	$	$	$	$	$	$	$	$	$
GROSS PROFIT	$	$	$	$	$	$	$	$	$	$	$
Ratio to net sales	%	%	%	%	%	%	%	%	%	%	%
SELLING AND GENERAL EXPENSES:											
Selling expenses	$	$	$	$	$	$	$	$	$	$	$
Administrative expenses											
TOTAL	$	$	$	$	$	$	$	$	$	$	$
NET INCOME BEFORE TAXES	$	$	$	$	$	$	$	$	$	$	$
Ratio to net sales	%	%	%	%	%	%	%	%	%	%	%

EXHIBIT D

THE XYZ COMPANY

INCOME STATEMENT – MARGINAL COST BASIS

	THIS MONTH	YEAR TO DATE
NET SALES	$40,000	$80,000
VARIABLE COST OF SALES – at standard:		
Materials	$10,000	$21,000
Direct labor	3,000	7,000
Factory expenses	7,000	13,000
Total	$20,000	$41,000
Change in finished goods inventory – at variable cost	2,310	4,600
Total	$17,690	$36,400
MARGINAL PROFIT – at standard	$22,310	$43,600
P/V ratio	56%	55%
VARIANCES ON VARIABLE COSTS:		
Materials price	$ 500	$ 200
Materials usage	100	150
Labor rate	50	(100)
Labor productivity	20	250
Factory expense	20	50
Total	$ 690	$ 550
MARGINAL PROFIT – at actual	$23,000	$44,150
Ratio to net sales	57%	55%
FIXED MANUFACTURING EXPENSES	$12,400	$24,150
NET MANUFACTURING MARGIN	$10,600	$20,000
ADJUSTMENT TO FULL COST BASIS OF VALUING INVENTORIES	600	300
GROSS PROFIT	$10,000	$19,700
Ratio to net sales	25%	25%
OTHER FIXED EXPENSES:		
Selling expenses	$ 2,500	$ 3,150
Administrative expenses	1,500	2,550
Total	$ 4,000	$ 5,700
NET INCOME BEFORE TAXES	$ 6,000	$14,000

EXHIBIT E

THE XYZ COMPANY

REPORT ON PROFIT PLAN

	THIS MONTH ACTUAL	YEAR TO DATE ACTUAL	NEXT MONTH FORECAST	ENTIRE YEAR FORECAST
NET INCOME BEFORE TAXES:				
Master profit plan	$ 8,200	$16,400	$ 8,200	$ 98,400
Actual and latest forecast	6,000	14,000	6,270	80,500
Gain (loss) from plan	$(2,200)	$(2,400)	$(1,930)	$(17,900)
ANALYSIS OF GAIN OR LOSS:				
Responsibility of sales:				
Volume gain (loss)	$ (400)	$ (600)	$ (300)	$ (3,600)
Mix gain (loss)	(800)	(1,300)	(1,550)	(18,000)
Price variance	1,000	800	400	4,800
Cost variance	(1,000)	(1,200)	(600)	(7,200)
Selling expense under (over) budget	200	400	200	2,400
Total	$(1,000)	($1,900)	$(1,850)	$(21,600)
Responsibility of manufacturing:				
Materials price variance	$ 500	$ 200	$ 350	$ 3,600
Materials usage variance	100	150	125	2,500
Labor rate variance	50	(100)	(25)	(300)
Labor productivity variance	20	250	135	2,500
Factory expense under (over) budget:				
Variable costs	20	50	35	400
Fixed expenses	(490)	(150)	(300)	(1,000)
Total	$ 200	$ 400	$ 320	$ 7,700
Responsibility of administration:				
General expenses under (over) budget	$(1,500)	$(1,150)	$ (525)	$ (6,500)
Other	100	250	125	2,500
Total	$(1,400)	$ (900)	$ (400)	$ (4,000)
TOTAL AS ABOVE	$(2,200)	$(2,400)	$(1,930)	$(17,900)

EXHIBIT F

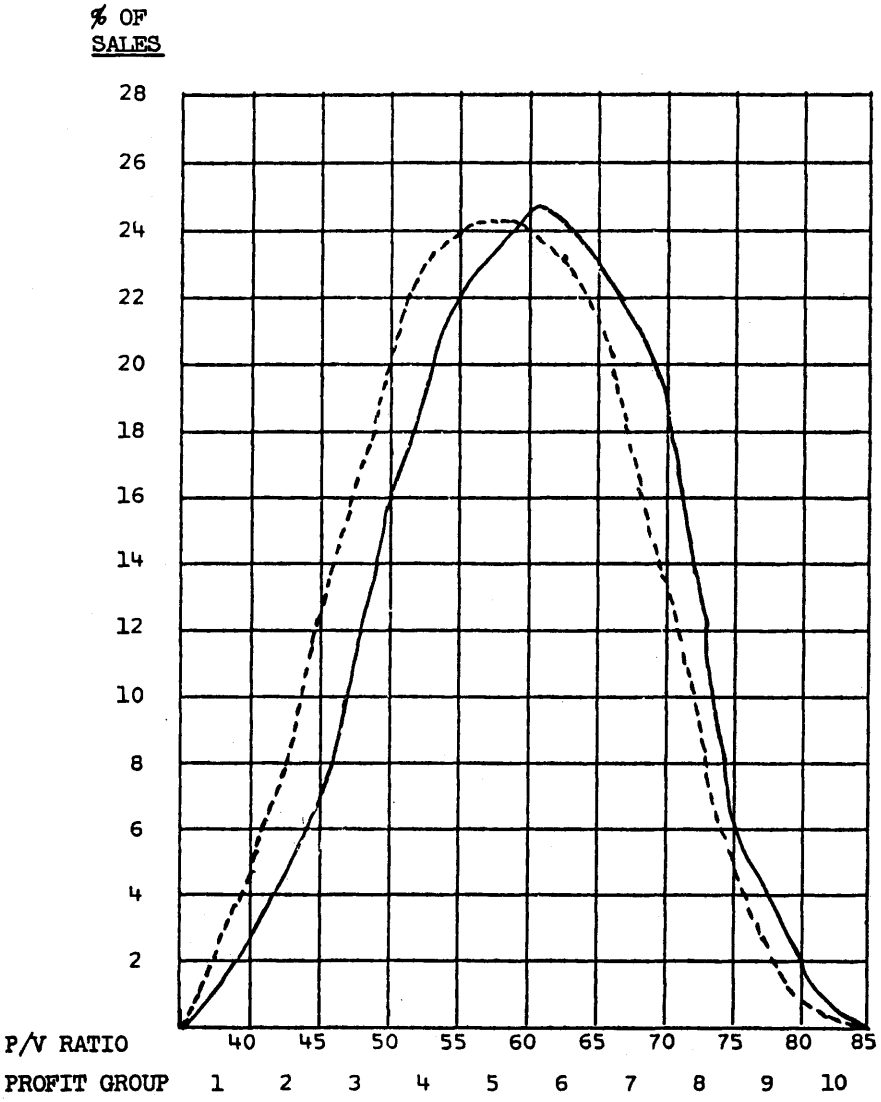
THE XYZ COMPANY

MARGINAL PROFITS – GAIN OR LOSS FROM PLAN

PROFIT GROUP	P/V RANGE	GAIN (LOSS) FROM PLAN			
		TOTAL	VOLUME AND MIX	PRICE	COST
1	0 – 39%				
2	40 – 44%				
3	45 – 49%				
4	50 – 54%				
5	55 – 59%				
6	60 – 64%				
7	65 – 69%				
8	70 – 74%				
9	75 – 79%				
10	80 – 99%				

THE XYZ COMPANY

SALES MIXTURE CHART



LEGEND:

_____ Planned sales mix

----- Actual sales mix

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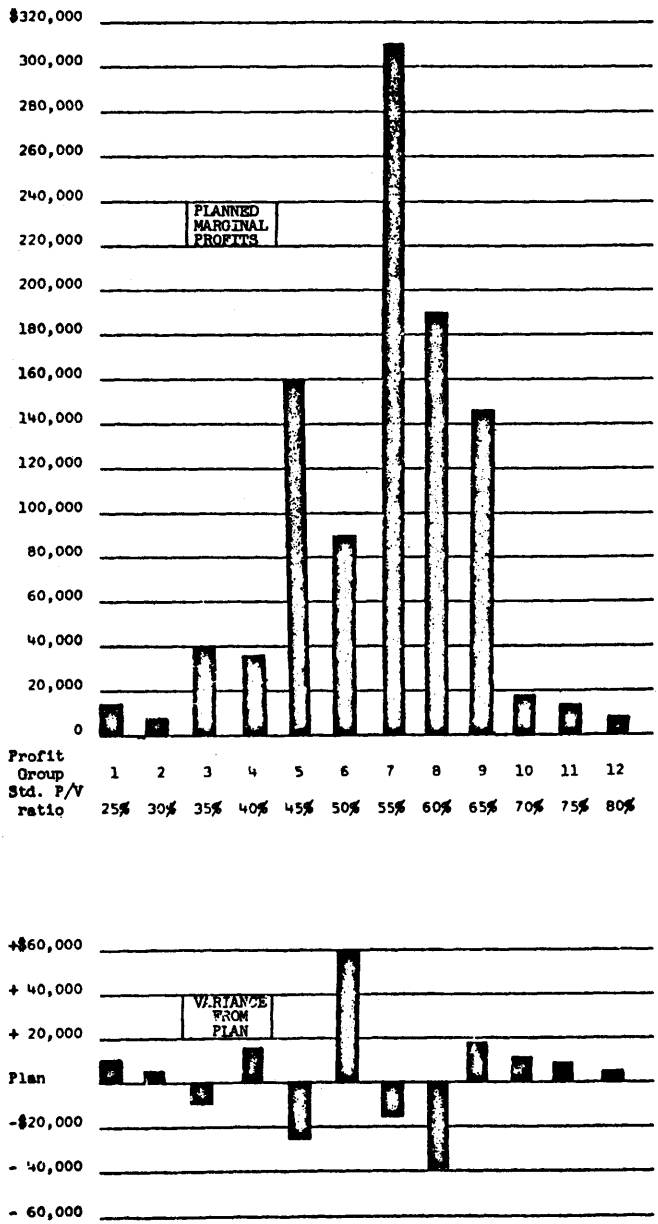
MONTHLY MARGINAL PROFITS
GAIN OR LOSS FROM PLAN



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TREND OF MARGINAL PROFITS
PROFIT GROUP 7. PLANNED P/V=67%